THE COLEOPTERA OF UTAH—CICINDELIDÆ[1]

BY VASCO M. TANNER

This paper is the first of a series in which the writer proposes to deal with the Coleoptera fauna of Utah and portions of the Great Basin. Many of our noted coleopterists have collected in various parts of this region, but very little has been published on their findings. It is the purpose of these papers to bring together what is known and make additions from my collection which has been obtained from all parts of the state.

I wish to thank Dr. Frank E. Blaisdell, Sr.; Mr. L. L. Buchanan, Mr. Warren Knaus, Dr. Walther Horn, and Professor H. E. Wickham for notes on Utah collections and expressions of opinion concerning certain species.

CICINDELIDÆ

1. Amblycheila schwarzi W. H.

Bellevue, Washington County, 1917 (Engelhardt and Doll).

In my correspondence with Mr. Warren Knaus he informs me that two specimens of this species were found dead in a pool in Ash Creek near Bellevue, Utah, by Mr. George P. Engelhardt and Mr. Jacob Doll in 1917. I have collected at various seasons of the year for several years in this region, but have not found this species. It seems to be very rare.

2. Cicindela purpurea var. auduboni Lec.

Great Salt Lake Valley, 1850 (Captain Howard Stansbury); City Creek Canyon near Salt Lake City, March and June (John Sugden and G. W. Browning).

The first insects taken in Utah for scientific purposes were collected by Captain Stansbury and his party during the years 1849-50. The poor means of caring for and transporting collections made it almost impossible to get large collections back to the eastern centers of study. Professor S. S. Haldeman, who studied the Stansbury collection, reported eleven species of insects from Utah, six of which were Coleoptera.

3. Cicindela purpurea var. graminea Schp.

Provo, April, 1915, 1928, 1929; Indianola, May, 1927 (Vasco M. Tanner); Salt Lake City, June, 1915 (John Sugden); Lava Hot Springs, Idaho, May, 1928 (D. E. Beck).

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1 Contribution No. 19 from the Department of Zoölogy and Entomology, Brigham Young University, Provo, Utah.

4. CICINDELA PURPUREA var. NIGERRIMA Leng

City Creek Canyon, Salt Lake City, April and August (Browning and Sugden).

Professor H. E. Wickham informs me that he has specimens of this species which were taken by Mr. Browning in April.

5. CICINDELA CIMARRONA Lec.

Logan, April, 1915 (Harold Hagen and Herbert Pack); Wellsville, June, 1926 (Tanner).

6. CICINDELA REPANDA Dej.

Great Salt Lake Basin, 1871 (Hayden Survey); Douglass, Dinosaur Quarry, July, 1926 (Tanner); Duchesne, July, 1926 (Tanner and C. J. D. Brown); Green River, June, 1927 (Tanner and J. Kartchner); Moab, June, 1927 (Tanner and Anson Call, Jr.).

This species was reported from the Great Salt Lake Basin by Dr. George H. Horn in the United States Geological Survey of Montana and Adjacent Territory, 1871 (1872), pp. 382-392. Mr. Cyrus Thomas and other members of the Hayden party collected the beetles of this report between June 1 and July 6, 1891: "Starting from Ogden, Utah, through the Salt Lake Basin, by way of Brigham City, Boxelder Creek, Copenhagen, and Cache Valley; thence out of the Salt Lake Basin to Port Neuf River and Port Hall." Mr. E. T. Cresson, Jr., of the Academy of Natural Sciences of Philadelphia informs me that there is one specimen of *repanda* from Utah in the Horn collection.

Dr. Horn reports the following species as being widely distributed over the territory studied: *C. 12-guttata* Dej., *C. purpurea* Oliv., *C. punctulata* Fab. and *C. tranquebarica* Hbst. (*vulgaris* Say). There must be some mistake about *C. 12-guttata* Dej., as it was no doubt taken in the eastern part of the territory, probably Kansas.

Mr. J. D. Putnam (Davenport Acad. of Sci., Vol. 1, 1876, pp. 199-204), lists the Coleoptera collected in the vicinity of Spring Lake Villa, six miles south of Payson, Utah. The following Cicindelids were reported: *C. 12-guttata* Dej., *C. senilis* Horn, *C. tranquebarica* Herbst. and *C.* near *purpurea* Oliv. *Cicindela senilis* Horn may be confused with *C. echo* Csy.

The twenty-one Utah specimens of this species in my collection are all more coppery in luster and have broader macula-

tions than any of my eastern specimens. Dr. Blaisdell has a series of *repanda* which he collected at Baltimore, Maryland, which shows a wide variation with respect to the maculations; some of them are three times as wide as others.

7. Cicindela hirticollis Say

Moab, June, 1927 (Tanner and Irvin Rasmussen); St. George, March to November, 1917, 1921, 1922 (Tanner); Mesquite, Nevada, May, 1922 (Tanner).

This species is abundant on the muddy flood plains of the Virgin River and the Santa Clara Creek, near St. George.

8. Cicindela tranquebarica Hbst.

St. George, June, 1919 (Knaus); April, 1922 (Tanner); Zion National Park, June, 1919 (Knaus); June, 1929 (Tanner).

9. Cicindela tranquebarica lassenica Csy.

City Creek Canyon, near Salt Lake City, 1928 (G. Rasmussen).

This is a distinctive form and a new record for Utah.

10. Cicindela tranquebarica horiconensis Leng

St. George, April-May, 1917, 1921, 1922 (Tanner); June, 1919 (Knaus and Spalding); Zion National Park, 1919 (Knaus and Spalding); May, 1924 (Tanner); Shores of Great Salt Lake, June, 1915 (Sugden).

11. Cicindela tranquebarica kirbyi Lec.

Raft River Mountains, June, 1928 (Tanner); Logan, 1909 (E. G. Titus); Farr West, June, 1926 (Tanner); Bear Lake, near Lakota, June, 1926 (Tanner and Lynn, Hayward); Sheep Creek, Daggett County, June, 1926 (Tanner); Sinks and Dunes, South Lynndyl, September, 1926 (Tanner); Marysvalle, July, 1927 (Tanner); St. George, September, 1928 (Tanner); Bluff, July, 1927 (Tanner and Kartchner).

12. Cicindela tranquebarica admiscens Csy.

Price, June, 1927 (Tanner); Sheep Creek, June, 1926 (Lynn Hayward); Fort Bridger, Wyoming, June, 1926 (Tanner).

The nine specimens of this variety in my collection agree with the Casey specimens, but I question the advisability of separating these from the variety *kirbyi*. The color, pubescence, and elytral markings are variable in these two forms. I can find no distinctive morphological differences.

13. Cicindela vibex var. inyo Fall

Zion National Park, September, 1916, June, 1917, August, 1920, August-September, 1922, August, 1925, 1926, 1927, 1928 (Tanner); June, 1919 (Knaus).

14. Cicindela vibex var. owena Fall

Cicindela kirbyi var. *uintana* Csy. (type locality, Zion National Park)

Zion National Park, June, 1917 (Tanner); June and September, 1921, August, 1922, 1926, 1928 (Tanner); Iron Springs, Iron County, June, 1919 (Knaus).

I have had the opportunity of studying Colonel Casey's type of *uintana* and I am convinced that it is only a well-marked specimen of the variety *owena*. In the large series of *inyo* and *owena* of my collection from Zion Park there is a great deal of variation, depending upon the time of the year they are taken.

15. Cicindela vibex var. moapana Csy.

Provo, August 20 (Wickham).

Professor Wickham informs me that he collected this form of *vibex* at Provo, but I have never been able to distinguish this variety in specimens I have taken in Utah.

16. Cicindela tenuicincta Schp.

East shore of Great Salt Lake, June 25, 1902 (Knaus); Saltair, June 21 (Wickham), September 26, 1925 (Tanner).

This species seems to be restricted in Utah to the shores of Great Salt Lake, where it is abundant.

17. Cicindela longilabris Say

Emerald Lake, Mount Timpanogos, August, 1927 (Tanner).

This species is rarely found in Utah. I have never seen any of the green maculate specimens like the ones I have from Montana that have been taken in Utah. I doubt that *C. perviridis* has ever been taken in Utah and hence I am not including it in this list.

18. Cicindela montana Lec.

Cicindela montana var. *uteana* Csy. (type locality, Provo Canyon, Utah)

American Fork Canyon, 1876 (F. C. Bowditch); Aspen Grove, Mount Timpanogos, July and August, 1925, 1926, 1927 (Tanner); Deer Creek Canyon (Spalding); Greendale, Uinta Mountains, June, 1926 (Tanner); Uinta National Forest, August 3 (Silver); Park City,

August, 1927 (O. W. Olsen); Logan Canyon, June, 1926 (Tanner and C. Cottam); Deep Creek Mountains, June, 1928 (Tanner); Raft River Mountains, June, 1928 (D. E. Beck, Fred Richin and Tanner); Pine Valley Mountains, September, 1922 (Tanner); Paris Canyon, Idaho, July 2, 1920 (B. C. Cain); Lava Hot Springs, May, 1927 (Beck); Fort Bridger, Wyoming, June, 1926 (Tanner); Kaibab Forest, Arizona, July, 1927 (Tanner).

I agree with Professor Wickham that *montana* should be given specific rank. It is a distinctive species, though extremely variable, and is widely distributed throughout Utah. During the past summer (1928) I had the privilege of studying Colonel Casey's collection of Cicindelidæ, now in the National Museum. I have also recently submitted specimens of this group and other groups to Mr. L. L. Buchanan, who kindly studied them in connection with the Casey types. With this material before me I am convinced that most of the species and subspecies from Utah named by Casey in his last memoir (1924) should be placed in synonymy.

I have studied over a hundred specimens of *montana* and find some specimens with "subcupreous" heads and thorax and black elytra, while others have blackish heads and thorax and elytra that are subcupreous in color. The abdomens vary from dull greenish, blackish, bluish to blue-green. I have also taken the "subcupreous-brown" and black specimens in copula.

Mr. Knaus reports that he has specimens of *C. longilabris* var. *chamberlaini* Knaus and *C. longilabris* var. *vestalia* Leng, collected by Mr. Spalding in Provo Canyon. I have submitted specimens to Mr. Knaus, but he has not reported the results. I am unable to distinguish these varieties in my specimens; in fact since studying specimens of *vestalia* Leng I am inclined to believe that neither of these varieties are found in the Utah fauna.

19. Cicindela laurenti Schp.

Parowan Canyon, July, 1921 (Knaus); Cedar Breaks, August, 1921 (B. C. Cain); La Sal Mountains, June, 1927 (Tanner, Call, Rasmussen, Kartchner).

A distinctive species. My nineteen specimens are uniform in color, markings and size.

20. Cicindela oregona Lec.

Provo (common from May until October); Riverdale, Weber River, June, 1926 (Tanner, Hayward, Cottam); Wellsville, June, 1926 (Tanner); Farr West, June, 1926 (Tanner); Logan, August, 1924 W. W. Henderson); Flaming Gorge, Green River, June, 1926 (Tanner); Douglass, Dinosaur Quarry, July, 1926 (Tanner); Aspen Grove, Mount Timpanogos, August, 1926-27 (Tanner); Thistle, Spanish Fork Canyon, July 22, 1922 (Tanner); Salt Creek Canyon, near Nephi, July 20, 1922 (Tanner); Sevier River at Lynndyl, July 26, 1922 (Tanner); Sinks and Dunes, South Lynndyl, September, 1927 (Tanner); Beaver, July, 1923 (Tanner); Callao, June, 1928 (Tanner); Mud Lake, Paris, Idaho, June, 1926 (Tanner, Hayward, Brown, Cottam); Mesa Verde National Park, Colorado, July, 1927 (Tanner and Call).

This species is common in the northern part of the state. Mr. Knaus reports that he has taken it at St. George and Zion Park, but I have never taken what I consider to be the true *oregona* in the Virgin River Valley.

21. Cicindela oregona guttifera Lec.

Sheep Creek, Duchesne County, June, 1926 (Tanner); Aspen Grove, July and August, 1925, 1926, and 1927 (Tanner); Provo Canyon (Knaus); Utah Lake (Tanner); Woodside, June 1927 Kartchner); Moab, May, 1928 (W. J. Gertsch); Mesa Verde National Park, Colorado, July, 1927 (Call, Kartchner, Tanner).

This form of *oregona* seems to be more in the Colorado River drainage area than in the Great Basin of Utah.

22. Cicindela oregona maricopa Leng

Cicindela provensis Csy. (type locality, Provo Canyon).
Cicindela provensis mormonella Csy. (type locality, Utah).
Cicindela provensis nephiana Csy. (type locality, Parowan, Utah).

St. George, June to August, 1921, 1922, and 1925 (Tanner); Pine Valley, June, 1922, 1929 (Tanner, Doyle, Liddle, and Tony Bentley); Central, June, 1921, 1922, 1923, 1925 and 1929 (Tanner); Mountain Meadows, June, 1923 (Tanner); Toquerville, June 15, 1924 (Tanner); Cedar City, July, 1922 (Tanner); Beaver, July, 1924 (Henderson); Utah Lake, May, 1928 (Tanner); Aspen Grove, Mount Timpanogos, July, 1926 and 1927 (Tanner); Brighton, August, 1926 (Sugden); Vineyard, July (Spalding); Parowan Canyon, July (Spalding).

Last summer while I was at the National Museum I. studied the Casey types of the above forms and made careful notes. Since then Mr. Buchanan has kindly compared a number of specimens with each type. With these and several hundred

specimens of the *oregona* group for study I am forced to the conclusion that *C. provensis, C. p. mormonella,* and *C. p. nephiana* are only color phases of *C. o. maricopa* Leng. I have relaxed and studied scores of specimens in this group, but I have failed to find any constant morphological differences. While collecting specimens of this group I have paid special attention to their association and have found greenish and deep-blue specimens on the same sandy river bottom. In Zion Park I collected specimens that are identical with Casey's *provensis* that were in copula with specimens that have been identified as *maricopa.* Several color phases may be taken throughout the season in the same locality which suggests that they may be physiological responses to an environmental complex. Some workers, past and present, seem to take a delight in gathering and naming the fortuitous variations of taxonomic units. Mr. Spalding picked out his most likely variations and sold them to Colonel Casey!

23. CICINDELA OREGONA OREGONELLA Csy.

(Type locality, Deer Creek, Provo Canyon, Utah)

Aspen Grove, Mount Timpanogos, July (Tanner); Deer Creek, Provo Canyon (Spalding); Logan, August, 1924 (Henderson); Sinks and Dunes, South Lynndyl, September, 1926 (Tanner); St. George, May, 1922 (Tanner); Zion Park, August 25, 1925 (Tanner).

The specimens listed here under *oregonella* run in Casey's key (1913, p. 29), to *sonoma,* but since I do not have material that has been compared with *sonoma* I am referring my specimens to a form I have studied, *oregonella,* which may prove to be a synonym. In my specimens the elytra lack the punctures and are "densely microgranulate" and the surface is opaque, but never metallic. They vary in color above from black to dirty brownish and dull greenish, beneath greenish to deep blue. Four specimens from near Lynndyl are black opaque above and dull greenish beneath. The head and thorax, except on the lateral part, are devoid of hairs. This form seems to be distinct enough to warrant separating it from the three *oregona* groups listed above.

24. CICINDELA WILLISTONI var. ECHO Csy.

(Type locality, shores of Great Salt Lake, Utah)

Great Salt Lake, 1904 (Wickham), June, 1926 (Tanner, Brown,

Cottam, and Hayward), 1921 (Knaus); Stansbury Island, Great Salt Lake, July, 1913 (Pack, Hagen, and Titus); Sevier Lake, 1904 (Wickham); Little Salt Lake, Parowan, July, 1921 (Knaus); June, 1928 and 1929 (Tanner, Bentley, and Liddle).

This species is common around the salty lakes of Utah.

25. CICINDELA WILLISTONI SPALDINGI Csy.

(Type locality, Callao, Utah)

Callao, June (Spalding).

I have seen but one specimen of this unique, the type, and it seems distinct enough to be separated from other varieties of this group. In many ways it is more closely related to the *fulgida* group than to the *willistoni* units.

26. CICINDELA TANNERI Knaus

(Type locality, Green River, Utah)

Green River, June, 1927 (Tanner and Kartchner); Duchesne, July, 1926 (C. J. D. Brown).

This species was rather common on the alkali flats near the river.

27. CICINDELA PAROWANA Wickh.

(Type locality, Salt Lake near Parowan, Utah)

Cicindela parowana var. *remittens* Csy. (type locality, Callao, Utah)

Little Salt Lake, near Parowan, August 11 (Wickham); July (Knaus); June (Tanner); Callao, June 5 (Spalding).

I have had an opportunity of studying all of Mr. Spalding's specimens of *parowana* and *remittens,* and after studying Colonel Casey's type there is no doubt but that *remittens* is a color phase and one that is extremely variable. The Callao specimens are reddish, greenish and bluish in color.

28. CICINDELA NIGROCŒRULEA Lec.

St. George, August, 1922 (Tanner).

I have only taken three specimens of this species in my many years of collecting.

29. CICINDELA PUNCTULATA Oliv.

St. George, August, 1923 (Tanner); Parowan, July (Knaus).

This species is not common in Utah and is usually associated with *chihuahuæ*.

30. CICINDELA PUNCTULATA CHIHUAHUÆ Bates

St. George, August, 1922 and September, 1927 (Tanner); July, 1921 (Knaus); Bellevue (Engelhardt); Zion Park, July, 1922 (Tanner); Parowan Canyon, July, 1921 (Knaus and Spalding).

This form seems to be confined to the southwestern part of the state.

31. CICINDELA TENUISIGNATA Lec.

Ash Creek near La Verkin, June, 1922 (Tanner).

The single specimen of this species taken at La Verkin is small with fine markings.

32. CICINDELA LEMNISCATA Lec.

St. George, August, 1922 (Tanner).

Three specimens came to the electric lights one warm, cloudy night. This seems to be a new record for Utah.

33. CICINDELA CARTHAGENA var. HÆMORRHAGICA Lec.

Saltair, July, 1921 (Knaus), August 29, (F. H. Shoemaker); June, 1926 (Tanner); Salt Lake Valley (Morrison); 1904 (Wickham); Farr West, June, 1926 (Brown); Parowan, July, 1921 (Knaus).

Mr. Leng reports *hentziana* from Utah and cites as his authority specimens in the Harris collection now in the Museum of Comparative Zoölogy at Harvard. Professor Nathan Banks has the following to say of this form in a letter under date of April 10, 1929: "In his (Harris's) collection I do not find any specimens under *hentzi,* but in his catalogue I find one sheet with these words, 'identical with, or very closely allied to the form on page 4052 (that is *hentzi*).' On this sheet there are records of specimens from St. George, Utah, July, H. F. Wickham, and 25 June, L. H. Joutel, and against the latter is the collecter, 'Fuchs collection 772 and 773.' However, as I said, I did not find these specimens under *hentzi* in his collection, and he may have transferred them later elsewhere without changing the records."

I have never taken any specimens that agree with Leng's description of this variety.

34. CICINDELA CARTHAGENA BISIGNATA Dokh.

Saltair, June 26 (Wickham).

The only record of this species in Utah is one specimen in the Harris collection. I question the identification of the specimen.

35. CICINDELA CARTHAGENA ARIZONÆ Wickh.

St. George, 1917 to 1929 during the summer (Tanner); June, 1921 (Knaus); Zion Park, August, 1922 (Tanner).

This species seems to be confined to the Virgin River Valley. It is common throughout the summer.

36. CICINDELA PUSILLA var. IMPERFECTA Lec.

Provo, June (Wickham); Saltair, June (Wickham and Tanner); Farr West, June, 1926 (Tanner, Brown, and Hayward); Rosevere Creek, Raft River Mountains, June, 1928 (Tanner); Sevier River, near Lynndyl, June, 1922 (Tanner); Sevier Lake, June (Wickham); Parowan, June and July (Spalding, Knaus, and Tanner); Sheep Creek, Duchesne County, July, 1926 (Brown); Callao, June, 1928 (Tanner); Bear Lake, near Paris, Idaho, June, 1926 (Hayward and Tanner). Fort Bridger, Wyoming, June, 1926 (Tanner).

This species is extremely variable in color as well as markings.

37. CICINDELA PUSILLA var. CINCTIPENNIS Lec.

Miners Peak, July (Spalding); Sheep Creek, June (Brown and Hayward); Price, June, 1927 (Tanner); Douglass, Dinosaur Quarry, June (Brown and Hayward).

38. CICINDELA CALIFORNICA var. PRÆTEXTATA Lec.

St. George, August (Spalding, Wickham, Tanner).

This species has always been taken at night around the light.

39. CICINDELA SPERATA Lec.

Bluff, July, 1927 (Tanner and Kartchner).

This specimen was taken along the San Joaquin River. It is a new record for Utah.

40. CICINDELA TOGATA var. GLOBICOLLIS Csy.

Saltair, June 26 (Wickham).

Professor Banks writes the following concerning this variety: "Of *C. bisignata* and *C. globicollis* there are of each, one specimen from Saltair, 26 June, H. F. Wickham, collector."

SUMMARY

1. In this paper forty species are listed for Utah and ten forms are treated as doubtful or synonyms, thus bringing the list to fifty species that have been referred to the state.

2. Utah is the type locality for eleven of the fifty forms.

3. Specimens of forty-three of the fifty forms are in my collection of eight hundred and thirty specimens of Cicindelids.